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Claims

1. Container for uptaking, or storing, or releasing, or uptaking and storing, or uptaking and releasing, or storing and releasing, or uptaking, storing and releasing at least one gas, comprising at least one opening for allowing the at least one gas to enter and exit or at least one opening for allowing the at least one gas to enter and at least one opening for allowing the at least one gas to exit said container, and a gas-tight mechanism capable of storing the at least one gas under a pressure of from greater than 45 to 750 bar inside the container, said container further comprising a metallo-organic framework material comprising pores and at least one metal ion and at least one at least bidentate organic compound which is bound to said metal ion.
2. Container according to claim 1 wherein the pressure is in the range of from greater than 45 to 150 bar, preferably in the range of from 50 to 150 bar and most preferably in the range of from 50 to 80 bar.
3. Container according to claim 1 wherein the gas is a hydrocarbon, preferably methane.
4. Container according to claim 1 wherein the at least one at least bidentate organic compound is coordinately bound to said metal ion.
5. Container according to claim 1 wherein said metal ion is selected from the group consisting of elements of groups Ia, IIa, IIIa, IVa to VIIIa and IB to VIb of the periodic table of the elements.

6. Container according to claim 1 wherein the metallo-organic framework material is contacted with at least one capacity-enhancing agent selected from the group consisting of solvents, complexes, metals, metal hydrides, alloys, and mixtures of two or more thereof.
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7. Container according to claim 1 wherein the bidentate compound is selected among substituted or unsubstituted aromatic polycarboxylic acids which may comprise one or more nuclei, and substituted or unsubstituted aromatic polycarboxylic acids which comprise at least one hetero atom and which may have one or more nuclei.
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8. Container according to claim 1 wherein the metallo-organic framework material exhibits a specific surface area of more than $20 \text{ m}^2/\text{g}$, determined via BET adsorption according to DIN 66131.
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9. Storage system comprising at least one container for uptaking, or storing, or releasing, or uptaking and storing, or uptaking and releasing, or storing and releasing, or uptaking, storing and releasing at least one gas, comprising at least one opening for allowing the at least one gas to enter and exit or at least one opening for allowing the at least one gas to enter and at least one opening for allowing the at least one gas to exit said container, and a gas-tight mechanism capable of storing the at least one gas under a pressure of from 1 to 750 bar inside the container, said container further comprising a metallo-organic framework material comprising pores and at least one metal ion and at least one at least bidentate organic compound which is bound to said metal ion.
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10. Fuel cell, comprising at least one container for uptaking, or storing, or releasing, or uptaking and storing, or uptaking and releasing, or storing and releasing, or uptaking, storing and releasing at least one gas, comprising at least one opening for allowing the at least one gas to enter and exit or at least one opening for allowing the at least one gas to enter and at least one opening for allowing the at least one gas to exit said container, and a gas-tight mechanism capable of storing the at least one gas under a pressure of from 1 to 750 bar inside the container, said container
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further comprising a metallo-organic framework material comprising pores and at least one metal ion and at least one at least bidentate organic compound which is bound to said metal ion.

- 5 11. Method of using a fuel cell according to claim 10 for supplying power to stationary, mobile, and mobile portable applications.
12. Method of using a fuel cell according to claim 10 for supplying power to power plants, cars, trucks, busses, cordless tools, cell phones, and laptops.
- 10 13. Method of transferring at least one gas from a storage system to a fuel cell, said storage system comprising at least one container for uptaking, or storing, or releasing, or uptaking and storing, or uptaking and releasing, or storing and releasing, or uptaking, storing and releasing at least one gas, comprising at least one opening for allowing the at least one gas to enter and exit or at least one opening for allowing the at least one gas to enter and at least one opening for allowing the at least one gas to exit said container, and a gas-tight mechanism capable of storing the at least one gas under a pressure of from 1 to 750 bar inside the container, said container further comprising a metallo-organic framework material comprising pores and at least one metal ion and at least one at least bidentate organic compound which is bound to said metal ion.
- 15 14. Method according to claim 13 wherein the at least one fuel cell comprises at least one container for uptaking, or storing, or releasing, or uptaking and storing, or uptaking and releasing, or storing and releasing, or uptaking, storing and releasing at least one gas, comprising at least one opening for allowing the at least one gas to enter and exit or at least one opening for allowing the at least one gas to enter and at least one opening for allowing the at least one gas to exit said container, and a gas-tight mechanism capable of storing the at least one gas under a pressure of from 1 to 750 bar inside the container, said container further comprising a metallo-organic framework material comprising pores and at least one metal ion and at least one at least bidentate organic compound which is bound to said metal ion.
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15. Method of uptaking, or storing, or releasing, or uptaking and storing, or uptaking and releasing, or storing and releasing, or uptaking, storing and releasing at least one gas wherein the at least one gas is uptaken, or stored, or released, or uptaken and stored, or uptaken and released, or stored and released, or uptaken and stored and released by a metallo-organic framework material comprising pores and at least one metal ion and at least one at least bidentate organic compound which is preferably coordinately bound to said metal ion wherein the metallo-organic framework material comprising pores is comprised in at least one container comprising at least one opening for allowing the at least one gas to enter and exit or at least one opening for allowing the at least one gas to enter and at least one opening for allowing the at least one gas to exit said container, and a gas-tight mechanism capable of storing the at least one gas under a pressure of from greater than 45 to 750 bar inside the container.
16. Method of using a metallo-organic framework material comprising pores and at least one metal ion and at least one at least bidentate organic compound which is preferably coordinately bound to said metal ion, for uptaking, or storing, or releasing, or uptaking and storing, or uptaking and releasing, or storing and releasing, or uptaking, storing and releasing at least one gas in stationary, mobile, or mobile portable applications, said applications comprising a container comprising said metallo-organic framework material comprising pores, said container further comprising at least one opening for allowing the at least one gas to enter and exit or at least one opening for allowing the at least one gas to enter and at least one opening for allowing the at least one gas to exit said container, and a gas-tight mechanism capable of storing the at least one gas under a pressure of from 1 to 750 bar inside the container.
17. Method according to claim 16 wherein the applications are power plants, cars, trucks, busses, cordless tools, cell phones, and laptops.

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18. Container having a non-cylindrical geometry for uptaking, or storing, or releasing, or uptaking and storing, or uptaking and releasing, or storing and releasing, or uptaking, storing and releasing at least one gas, comprising at least one opening for allowing the at least one gas to enter and exit or at least one opening for allowing the at least one gas to enter and at least one opening for allowing the at least one gas to exit said container, and a gas-tight mechanism capable of storing the at least one gas under a pressure of from 1 to 750 bar inside the container, said container further comprising a metallo-organic framework material comprising pores and at least one metal ion and at least one at least bidentate organic compound which is bound to said metal ion.
19. Container according to claim 18 wherein the pressure is in the range of from 1 to 150 bar, preferably in the range of from 1 to 80, more preferably in the range of greater than 45 to 80 bar and most preferably in the range of from 50 to 80 bar.
20. Container according to claim 18 wherein the gas is a hydrocarbon, preferably methane.
21. Container according to claim 18 wherein the at least one at least bidentate organic compound is coordinately bound to said metal ion.
22. Container according to claim 18 wherein said metal ion is selected from the group consisting of elements of groups Ia, IIa, IIIa, IVa to VIIIa and IB to VIb of the periodic table of the elements.
23. Container according to claim 18 wherein the metallo-organic framework material is contacted with at least one capacity-enhancing agent selected from the group consisting of solvents, complexes, metals, metal hydrides, alloys, and mixtures of two or more thereof.
24. Container according to claim 18 wherein the bidentate compound is selected among substituted or unsubstituted aromatic polycarboxylic acids which may

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comprise one or more nuclei, and substituted or unsubstituted aromatic polycarboxylic acids which comprise at least one hetero atom and which may have one or more nuclei.

- 5 25. Container according to claim 18 wherein the metallo-organic framework material exhibits a specific surface area of more than $20 \text{ m}^2/\text{g}$, determined via BET adsorption according to DIN 66131.
26. Storage system comprising at least one container according to claim 18.
- 10 27. Fuel cell, comprising at least one container having a non-cylindrical geometry for uptaking, or storing, or releasing, or uptaking and storing, or uptaking and releasing, or storing and releasing, or uptaking, storing and releasing at least one gas, comprising at least one opening for allowing the at least one gas to enter and exit
- 15 or at least one opening for allowing the at least one gas to enter and at least one opening for allowing the at least one gas to exit said container, and a gas-tight mechanism capable of storing the at least one gas under a pressure of from 1 to 750 bar inside the container, said container further comprising a metallo-organic framework material comprising pores and at least one metal ion and at least one at
- 20 least bidentate organic compound which is bound to said metal ion.
28. Method of using a fuel cell according to claim 27 for supplying power to stationary, mobile, and mobile portable applications.
- 25 29. Method of using a fuel cell according to claim 27 for supplying power to power plants, cars, trucks, busses, cordless tools, cell phones, and laptops.
- 30 30. Method of transferring at least one gas from a storage system to a fuel cell, said storage system comprising at least one container having a non-cylindrical geometry for uptaking, or storing, or releasing, or uptaking and storing, or uptaking and releasing, or storing and releasing, or uptaking, storing and releasing at least one gas, comprising at least one opening for allowing the at least one gas to enter and

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exit or at least one opening for allowing the at least one gas to enter and at least one opening for allowing the at least one gas to exit said container, and a gas-tight mechanism capable of storing the at least one gas under a pressure of from 1 to 750 bar inside the container, said container further comprising a metallo-organic framework material comprising pores and at least one metal ion and at least one at least bidentate organic compound which is bound to said metal ion.

31. Method according to claim 30 wherein the at least one fuel cell comprises at least one container having a non-cylindrical geometry for uptaking, or storing, or releasing, or uptaking and storing, or uptaking and releasing, or storing and releasing, or uptaking, storing and releasing at least one gas, comprising at least one opening for allowing the at least one gas to enter and exit or at least one opening for allowing the at least one gas to enter and at least one opening for allowing the at least one gas to exit said container, and a gas-tight mechanism capable of storing the at least one gas under a pressure of from 1 to 750 bar inside the container, said container further comprising a metallo-organic framework material comprising pores and at least one metal ion and at least one at least bidentate organic compound which is bound to said metal ion.

32. Method of uptaking, or storing, or releasing, or uptaking and storing, or uptaking and releasing, or storing and releasing, or uptaking, storing and releasing at least one gas wherein the at least one gas is uptaken, or stored, or released, or uptaken and stored, or uptaken and released, or stored and released, or uptaken and stored and released by a metallo-organic framework material comprising pores and at least one metal ion and at least one at least bidentate organic compound which is preferably coordinately bound to said metal ion wherein the metallo-organic framework material comprising pores is comprised in at least one container having non-cylindrical geometry comprising at least one opening for allowing the at least one gas to enter and exit or at least one opening for allowing the at least one gas to enter and at least one opening for allowing the at least one gas to exit said container, and a gas-tight mechanism capable of storing the at least one gas under a pressure of from 1 to 750 bar inside the container.

33. Method of using a metallo-organic framework material comprising pores and at least one metal ion and at least one at least bidentate organic compound which is preferably coordinately bound to said metal ion, for uptaking, or storing, or releasing, or uptaking and storing, or uptaking and releasing, or storing and releasing, or uptaking, storing and releasing at least one gas in stationary, mobile, or mobile portable applications, said applications comprising a container having a non-cylindrical geometry comprising said metallo-organic framework material comprising pores, said container further comprising at least one opening for allowing the at least one gas to enter and exit or at least one opening for allowing the at least one gas to enter and at least one opening for allowing the at least one gas to exit said container, and a gas-tight mechanism capable of storing the at least one gas under a pressure of from 1 to 750 bar inside the container.
34. Method according to claim 33 wherein the applications are power plants, cars, trucks, busses, cordless tools, cell phones, and laptops.